

temperature to press bead (or beads) 76 against the tubular web and seal the two layers together transversely at a location between successive packages.

The cutter assembly 67 has the knife blade 80 movable selectively into cutting position against an anvil (not shown) on the opposite jaw 41 by means of movable drive pin 81 which as programmed by the automated system moves longitudinally to engage knife 80 and push it forward to cut the web at a position located between two adjacent packages. If controlled by a solenoid or hydraulic cylinder the drive pin can be intermittently controlled at the times desired. However, if cyclically driven during each package forming cycle by a cam or the like, it is provided with an intermediate compressible spring assembly 82 so that it can proceed over the cycle even if the knife blade is stopped short of the cutting position by inserting pin 83 in the block 84. The blade 80 is stopped short of the cutting anvil because pin 86 hits the blade on entry to slot 85 and thus holds it away from cutting position to skip a cutting cycle whenever programmed by the accompanying system to operate solenoid coil 86 or some equivalent mechanism as a cam operated interposer. The solenoid coil 86 thus is used to selectively control the cutting cycle in the process of providing strips of two or more adjacent packages.

If FIG. 1 is viewed, it is seen then that the jaw assembly mechanism 17 is pivoted upwardly where the jaws can be closed to grip the web by means of cold jaws 65 thereby closing the web tubing and permitting entry of a product in tube 15 for forming a package around the product. As the jaws pivot downwardly by operation of the mechanism 18, and pull a corresponding length of web from the roll 10, there is time to heat seal at 21 and cut the web to form separate package unit 22 by cutting at the top of the preceding bag. A similar heat seal unit to 76 may be located on the jaw 40 beneath the knife 80 if desired to seal the top of the preceding bag, which is released when the jaws open to drop vertically into a bin or on a conveyor belt.

As may be seen from FIG. 5, the yoke member 46 at the link end of rod 48 (FIG. 2) may be fitted with a stripper spring assembly 90 which arranges spring 91 about the bolt 92 connected to threads 93 in rod 48, so that it compresses whenever member 89 hits an obstacle such as at the end of the jaw closing cycle. Thus, at the end of the jaw closing cycle when the link driving reciprocating member 32 is reversed, the spring 91 serves to provide a spring biased stripping action at the start of the reverse reciprocation to help the jaws open.

The microswitch assembly 94 is actuated whenever the spring 91 is compressed before the end of the jaw closing cycle and serves through appropriate control circuits to reverse the jaw control cylinder 30 and open the jaws. Thus, the spring 91 is designed to yield and operate switch 94, for example, if a person got his hand in between the jaws during a closing cycle as soon as member 89 is encountered to compress spring 91 and thus actuate switch 94. The switch also operates if undue friction is encountered or other objects impede the closing of the jaws and thus serves as a safety feature, and can be locked out when the jaws are nearly closed if the cylinder is reversed by other control means during the automatic cycle.

Typical control circuits that may be used in operation of the system are illustrated schematically in block diagram form in FIG. 6. Thus, the control panel 35 has at least package length control unit 101 and knife control

unit 102 which can be selectively operated respectively to control package length and the number of packages in a strip before cutting.

To produce two or more sequential packages between cuts of the web, counter 103 coupled to count package forming cycles is connected to operate the knife solenoid unit 104 to actuate solenoid coil 86 as previously described on a specified count of 1 or more thereby to form individual packages or strips of two or more successive packages.

The package length control might be effected over a limited range of lengths, for example, by the pivoting of the end seal carriage 18 around shaft 105 by means of actuator 106 and pivot arm 107 over a desired arc for moving upwardly the desired package length along the web path 19, then gripping the web at the uppermost travel position along path 19 and pulling downwardly a desired length to the lowermost travel position before releasing the web. The jaws may be controlled typically over the pivot cycle by the cam 110 and switch 111 through the jaw control circuit 112 to operate cylinder 30 in the manner hereinbefore described to close and open the jaws on the web along path 19 as the web is withdrawn. The before described alarm switch 90 can reverse cylinder 30 at any time during the jaw closing cycle to override cam switch 111. Routine synchronization will all automatic packaging operations in the system over a packaging cycle is done in a routine manner as indicated by the sync leads, and other interconnected timing or control actions are typified by lead 115.

It would not depart from this invention to use the jaw control mechanism in any suitable system for automatically producing bags as represented by control panel and machine mechanisms 25 which represents for example packaging systems of the type hereinbefore described and including machine controls and sequencing mechanisms. It is only necessary that the jaw controls 112 are programmed to close the jaws at point 120 to pull the web to position 121 where the jaws are opened thereby advancing the web through path 19 enough for forming one package of length 1. To the extent that any specific operation of the sequence in such controls are required to produce a preferred embodiment of this invention, the subject matter of copending U.S. applications Ser. No. 955,574 and Ser. No. 955,720 filed the same day herewith describing respectively (a) the timing and control systems and (b) the operation of the mechanism for advancing the web are incorporated herein in entirety.

#### INDUSTRIAL APPLICABILITY

The invention provides both a packaging system and mechanisms operable in an automatic packaging system for converting a continuous web into a sequence of packages preferably filled with products and cut from the web into individual package assemblies.

The mechanisms is preferably used with thermo-set plastic web materials to heat seal the web in formation of both longitudinal and transverse seals to form packages into which products such as peanuts or hardware are inserted and sealed.

The particular mechanisms afforded are simple, safe, sanitary, reliable, inexpensive and adaptable to various packaging conditions for food and other product lines, and is adaptable for use with product batch counters to control the exact number of items packaged.

We claim: